

GAO

Report to the Chairman, Subcommittee  
on International Security, Proliferation,  
and Federal Services, Committee on  
Governmental Affairs, U.S. Senate

September 1999

# EXPORT CONTROLS

Better Interagency  
Coordination Needed  
on Satellite Exports



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National Security and  
International Affairs Division

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September 17, 1999

The Honorable Thad Cochran  
Chairman, Subcommittee on International Security,  
Proliferation, and Federal Services  
Committee on Governmental Affairs  
United States Senate

Dear Mr. Chairman:

Since 1992, the Departments of State and Commerce have largely shared licensing responsibility for the export of commercial communications satellites. The Department of Defense (DOD) plays a role in these exports by reviewing export applications for the licensing agencies and by monitoring sensitive launch activities. Reports that U.S. satellite companies had provided China with sensitive technology useful for improving China's ballistic missiles focused congressional attention on the issue of satellite exports and led the House of Representatives to form the Select Committee on U.S. National Security and Military/Commercial Concerns With the People's Republic of China. Troubled by these reported transfers and concerned that the 1996 shift of most aspects of licensing responsibility for satellite-related exports from State to Commerce had weakened controls over these exports led Congress to pass legislation in 1998 returning control to State.

Although recent congressional actions have focused attention on launches in China, U.S. satellite manufacturers also use Russian and Ukrainian launchers. To help protect sensitive technologies during a satellite launch, the United States has entered into formal agreements with China, Russia, Kazakhstan, and Ukraine that give the United States the right to take steps to safeguard U.S. technology. These agreements articulate U.S. policy that no technology may be released that could improve a foreign country's launch vehicles because this technology could also be used to improve a country's ballistic missiles. To implement this policy and safeguard sensitive technology, Commerce and State attach conditions to export licenses.

Concerned that the problems with the exports of satellites were not limited to China, you asked that we identify the license conditions applied during the export control process to protect sensitive technology when using

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Chinese, Russian, and Ukrainian launch vehicles and determine whether unauthorized technology transfers and violations of export regulations have been identified with these launches. You also asked for our observations on whether recent legislative changes would reduce the risks of unauthorized exports of sensitive U.S. technology.

To address these issues, we obtained and reviewed State, Commerce, and DOD export licensing records for satellite exports for launch on Chinese, Russian, and Ukrainian launch vehicles. We interviewed officials from these agencies and also reviewed information provided by U.S. satellite companies. (See app. IV for a detailed description of our scope and methodology.)

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## Results in Brief

The Departments of Commerce and of State used licensing conditions to support U.S. policy outlined in government-to-government agreements with each country meant to help ensure that technology is safeguarded. The Departments of Commerce and of State included conditions meant to protect sensitive technology on 43 licensed commercial communications satellite launch campaigns by China, Russia, and Ukraine between 1989 and February 1999. Licenses for 35 launch campaigns included 5 conditions, while licenses for 8 launch campaigns issued by Commerce between 1994 and 1997 omitted 3 of these 5 conditions.<sup>1</sup> For these eight launch campaigns, Commerce did not require (1) DOD monitors, (2) preparation of technology control plans, or (3) strict compliance with the government's safeguards agreements.<sup>2</sup> At the time Commerce approved these export licenses, it did not consider these three license conditions necessary. Although DOD and State were involved in the interagency review of these export licenses, neither agency objected to the omission of these license conditions.<sup>3</sup> Since 1997, Commerce and State have included all five conditions in every licensed launch campaign.

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<sup>1</sup>The two conditions included on all launch campaigns were (1) outlining the limits of authorized technical data and (2) requiring exporters to restrict foreign personnel's physical access to U.S. technology.

<sup>2</sup>Though not required, DOD monitors did attend the launches, but not all technical meetings, for three of the eight launch campaigns. A fourth campaign from this eight was cancelled before launch.

<sup>3</sup>While State's Office of Defense Trade Controls issues export licenses for satellites and other Munitions List items, another part of State reviews and provides comments on Commerce export licenses.

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DOD and State documents show that monitoring problems, unauthorized transfers of technology and other violations of export control regulations possibly occurred in 14 launch campaigns in China, Russia, and Ukraine, including some of the campaigns where license safeguard conditions were omitted. These documents also show that sensitive technology was transferred in at least three cases and that two of these transfers raised national security concerns. Specifically, as a result of launch failure investigations conducted with the help of U.S. companies, China obtained information that could improve its launch vehicles and ballistic missiles. Many of the problems identified in the 14 launch campaigns arose because of confusion created by the shared licensing jurisdiction and a lack of clarity concerning the roles and responsibilities of each agency in licensing and monitoring these exports. Some problems occurred because the exporting companies did not have effective controls and procedures to ensure compliance with U.S. export regulations.

The October 1998 legislation that returned licensing authority for all commercial communications satellite exports from Commerce to State and led DOD to establish a monitoring organization should reduce confusion in the controls over these exports caused by the shared jurisdiction.<sup>4</sup> However, some confusion may remain because license applications received before the March 15, 1999, transfer of jurisdiction will still be processed by Commerce, and approved licenses will be valid for up to 2 years. Consequently, there will still be a need for the agencies to coordinate their policies and monitoring activities of foreign launches. Although this need exists, State, DOD, and Commerce have not agreed on or established clear procedures for each agency to follow in implementing the safeguards outlined in the government-to-government technology safeguards agreements. In implementing the legislative changes, DOD may have difficulty hiring and retaining qualified monitors experienced with the sensitive technologies at risk. Additionally, license processing times for satellite exports may also increase. State has not authorized the hiring of all the staff requested by its Office of Defense Trade Controls nor increased the pay structure of its licensing officers as recommended in a report by State's Office of Inspector General.

In this report, we are making a recommendation to improve State, Commerce, and DOD implementation of U.S. policy on protecting sensitive

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<sup>4</sup>Changes regarding satellite exports were made by the National Defense Authorization Act for Fiscal Year 1999 (P.L. 105-261, 112 Stat. 2173).

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satellite-related technology and to ensure compliance by U.S. exporters with U.S. satellite export regulations.

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## Background

U.S. export controls over commercial communications satellites are complicated, involve numerous agencies, and have changed frequently since 1988 when the United States first agreed to permit the use of Chinese launch vehicles. The U.S. export control system for dual-use items and items with military applications is divided into two regimes. Commerce licenses most dual-use items, which have both commercial and military applications, while State licenses munitions items, which are designed, developed, configured, adapted, or modified solely for military applications. By design, Commerce gives greater weight to economic and commercial concerns, implicitly accepting greater security risks, whereas State gives primacy to national security and foreign policy concerns, lessening—but not eliminating—the risk of damage to U.S. national security interests.<sup>5</sup> State's and Commerce's regulations define what items are controlled and what items require export licenses. These licenses define the item or technical assistance or data that is authorized for export and may include conditions that the exporter must follow in carrying out the export.

Prior to 1992, State was the sole export licensing authority for commercial communications satellites, but in 1992, State and Commerce began to share export-licensing jurisdiction. As a result of an interagency review completed in 1992 to identify dual-use items on the State Munitions List that could be transferred to Commerce while still protecting national security interests, Commerce was given authority to license commercial communications satellites that did not include certain militarily sensitive capabilities. Supporters of this move argued that such satellites were civilian in nature and that the United States was the only country to treat commercial communications satellites as a military export. State retained control over more advanced satellites as well as more advanced launch-related technical data.<sup>6</sup> As a result of the regulatory changes,

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<sup>5</sup>The following two GAO products discuss issues relating to the transfer of license authority to Commerce: [Export Controls: Issues Related to the Export of Communications Satellites](#) (GAO/T-NSIAD-98-208, June 10, 1998) and [Export Controls: Change in Export Licensing Jurisdiction for Two Sensitive Dual-Use Items](#) (GAO/NSIAD-97-24, Jan. 14, 1997).

<sup>6</sup>Commerce maintained jurisdiction over basic technical data needed to attach the satellite to the launch vehicle, commonly described as "form, fit, and function" data.

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Commerce and State shared satellite jurisdiction and, depending on the satellite's capabilities, either agency could issue an export license for the export of the satellite. If the export was licensed by Commerce but also involved the transfer of technical data beyond what was within Commerce's jurisdiction to control, then the exporter would also need to obtain a technical assistance license from State.

In 1996, the executive branch modified this shared arrangement and transferred licensing control for all commercial communications satellites, including those with sensitive military capabilities, to Commerce. As part of this change, Commerce placed additional regulatory controls on these satellites so as to provide the same level of control as found under State regulations.<sup>7</sup> After the 1996 change, State did not issue export licenses for satellites but was still responsible for issuing assistance licenses for technical data for those launch campaigns when the foreign launch required technical data beyond Commerce's jurisdiction to control. Based partly on concerns that the 1996 transfer of jurisdiction to Commerce had weakened controls over satellite exports, Congress returned satellite-licensing authority to State, effective March 15, 1999, in a provision in the National Defense Authorization Act for fiscal year 1999.

U.S. satellite manufacturers often use Chinese, Russian, and Ukrainian rockets to launch commercial communications satellites. Both Russia and Ukraine employ launch facilities in Kazakhstan, a former Soviet republic, and a new U.S.-Ukrainian, Russian, and Norwegian joint venture will use a sea-based platform for its launch operations. In 1988, the United States first agreed to permit the launch of U.S.-built commercial communications satellites on a non-allied country's launch vehicle with an agreement permitting China to launch U.S.-made satellites.<sup>8</sup> At that time, just 2 years after the space shuttle Challenger disaster, the U.S. launch industry was struggling to meet the launch needs of the satellite industry. The first launch in China of a U.S.-built satellite occurred in 1990. In 1993 and 1996, the United States reached agreement with Russia and Ukraine to permit the use of their launch vehicles to place U.S.-made communication satellites into orbit.

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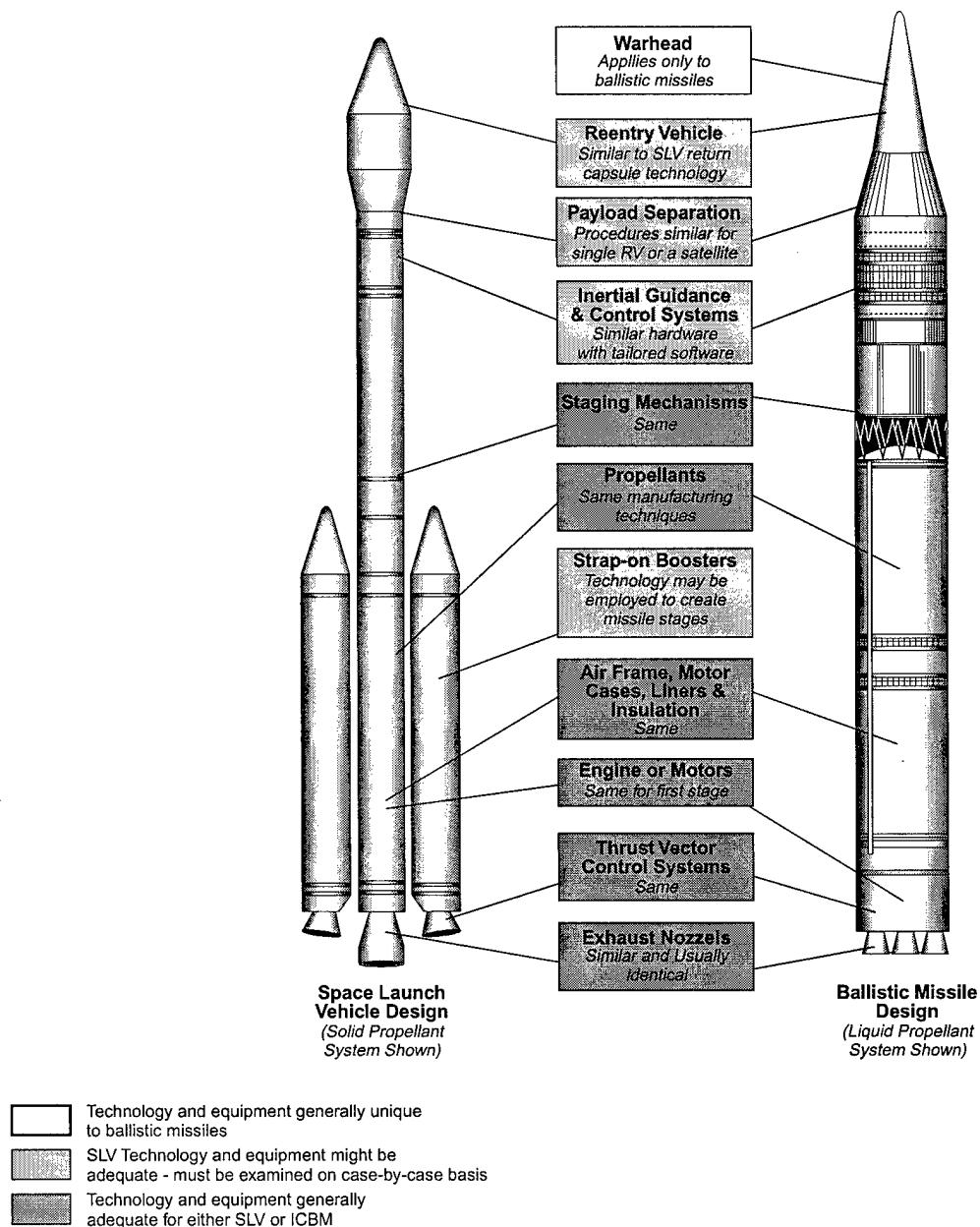
<sup>7</sup>Changes included the establishment of the "significant item" control category for satellites to control their export to all destinations and new approval procedures that required that licensing decisions for these satellites be made by majority vote of the reviewing agencies.

<sup>8</sup>The United States first used Japanese launch vehicles in 1977 and French/European launch vehicles in 1983.

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The reason export licenses are necessary and U.S. policy is not to transfer technology that could improve a foreign country's launch vehicles is that the technology used in launch vehicles to place a satellite into orbit can also be used in developing ballistic missiles. As shown in figure 1, the similarities in technology include (1) reentry vehicle technology; (2) payload separation technology; (3) inertial guidance and control systems; (4) staging mechanisms; (5) propellants; (6) airframes, motor casings, and insulation; (7) engines; (8) thrust vector control systems; and (9) exhaust nozzles. The sensitivity of the U.S. technology at risk is different for each foreign launch depending on the capabilities of the country providing the launch service.

Figure 1: Applicability of Space Launch Vehicle Technology to Ballistic Missiles



Source: Central Intelligence Agency.

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U.S. policy has consistently specified that an exported commercial communications satellite for launch by China, Russia, or Ukraine may not include technology that could improve the design, development, or production of the foreign country's launch vehicle. To ensure that sensitive technology is protected while using Chinese, Russian, and Ukrainian launch vehicles, the United States negotiated detailed, government-to-government technology safeguards agreements with each country. The agreements apply to all phases of the launch and establish the rights of the United States to safeguard satellite exports in the foreign country. The agreements limit the technical data that can be provided and prohibit the transfer of technical data not authorized for release. The agreements also require that physical access to the satellite and related equipment be restricted 24 hours a day. The agreements require the United States to oversee and monitor implementation of technology transfer control plans and establish the right of the United States to monitor meetings and launch operations.<sup>9</sup>

Many of the safeguard mechanisms discussed in the technology safeguards agreements, including having monitors and using technology transfer control plans, are implemented through the attachment of conditions on export licenses for the satellite. These licensing conditions are typically imposed after an interagency review of the export application and a discussion of the technologies involved and the safeguards that are appropriate. DOD plays a supporting role in exports of commercial communications satellites by reviewing and making recommendations on both Commerce and State export license applications and providing monitors at technical meetings and at launches to ensure compliance with export licenses. Prior to the 1999 transfer of jurisdiction, State also reviewed Commerce satellite export applications and made recommendations concerning whether the applications should be approved and what conditions should be attached to the licenses to safeguard the exports.

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<sup>9</sup>A technology transfer control plan is a plan developed by the U.S. exporter and approved by the U.S. government that outlines security measures to be followed during the launch campaign. The agreements also note that, in cases where there is a disagreement, the provisions of the technology safeguards agreements take precedence over the technology control plans.

## Safeguard License Conditions Applied, With Some Exceptions

Thirty-five of the 43 launch campaigns licensed to use Chinese, Russian, and Ukrainian launch vehicles since 1989 included five license conditions to protect sensitive U.S. technology. However, Commerce approved eight launch campaigns before 1997 that omitted license conditions requiring (1) DOD monitors, (2) preparation of a technology control plan, or (3) explicit compliance with the government-to-government technology safeguards agreements. Commerce's policy before 1997 was to not explicitly require these license conditions and, during the interagency review of these eight export licenses, neither State nor DOD requested that Commerce include these conditions. Since 1997, Commerce has applied these license conditions to all launch campaigns.

## Safeguards Used on Licensed Launches in China, Russia, and Ukraine

Between 1989 and February 1999, the Departments of Commerce and State issued licenses for 43 overseas launches of U.S.-manufactured commercial communications satellites in China, Russia, and Ukraine.<sup>10</sup> Commerce licensed the satellite export for about three-quarters of the launch campaigns, and State licensed the remaining one-quarter (see table 1). Because State regulations require a separate license application for the actual satellite, technical data needed to conduct the launch, and other activities, multiple licenses were often issued for a single launch campaign. We identified over 100 licenses associated with these launches.

**Table 1: Launch Campaigns by Licensing Agency, 1989 – February 1999**

Lead licensing agency	Country of launch service provider			Total
	China	Russia	Ukraine	
Commerce	13	19	0	32
State	7	3	1	11
<b>Total</b>	<b>20</b>	<b>22</b>	<b>1</b>	<b>43</b>

Note: State or Commerce is cited as the licensing agency if it issued an export license for the satellite.  
Source: Our analysis based on Commerce and State licensing records.

<sup>10</sup>In the 43 launch campaigns, 82 satellites were launched. The number of satellites launched exceeded the number of launches because rockets often launched more than one satellite. In our study, we included several licenses that, although issued, were eventually not used.

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We reviewed each of the export licenses issued by State and Commerce for these 43 launch campaigns and identified five general categories of licensing conditions the agencies used to protect against the transfer of sensitive technology and implement the government-to-government technology safeguards agreements. These agreements discuss U.S. rights in each of these general categories and describe in detail issues such as the limitations on the exchange of technical data and the physical security procedures that must be followed. State, DOD, and Commerce officials noted that these safeguards are now routinely implemented through conditions on export licenses.

The five categories of conditions used by State and Commerce to protect sensitive technology and implement the technology safeguards agreements include

- outlining the limits of authorized sensitive technical data exchange between the satellite exporter and the foreign launch service provider;
- restricting physical access of foreign personnel to U.S. technology;
- requiring exporter compliance with the negotiated government-to-government technology safeguards agreements;
- requiring the exporter to develop a DOD-approved technology transfer control plan outlining the exporter's internal control procedures for preventing disclosure of technology; and
- requiring DOD monitors at technical meetings related to launches and at the launches as well as reimbursement to the U.S. government for the monitors.

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**Licensing Safeguards Were Generally Applied**

Commerce and State required all five safeguard conditions to protect sensitive U.S. technology on 35 of the 43 satellite launch campaigns. As table 2 shows, export licenses in all of the launch campaigns since 1989 contained language clearly limiting the scope of the technical data that the satellite manufacturers could supply to the foreign launch service providers. Table 2 also shows that export licenses for all of the launch campaigns contained explicit descriptions of measures intended to limit physical access to the satellite and any technical data not covered by the license. Export licenses for a large majority of the launch campaigns also included requirements for DOD monitors at technical meetings and the launch, the preparation of a DOD-approved technology transfer control plan, and strict compliance with the technology safeguards agreements between the United States and China, Russia, or Ukraine.

**Table 2: Frequency of License Safeguards Required by the Lead Licensing Agency, 1989 – February 1999**

License safeguard	Launch campaign lead licensing agency		Total all campaigns	
	Commerce (percent)	State (percent)	Percent	Number
Limit technical data transfer	100	100	100	43
Restrict physical access to satellite	100	100	100	43
Require U.S. company compliance with government technology safeguards agreement	75	100	81	35
Require U.S. company to prepare a technology control plan	75	100	81	35
Require DOD monitors at meetings and the launch and reimbursement for DOD monitoring expenses	75	100	81	35

Source: Our analysis based on Commerce and State licensing records.

### Commerce Did Not Require Some Safeguards on All Launch Campaigns

Commerce licensed eight launch campaigns without license conditions that require (1) technology control plans, (2) DOD monitors, and (3) compliance with the technology safeguards agreement between the United States and the relevant government (see table 3). At the time Commerce approved these export licenses, it did not consider these three license conditions necessary. Though they were not required in the licenses, DOD monitors did observe the launch, but not all of the technical meetings, for three of these campaigns, and another campaign was canceled prior to launch. Neither State nor DOD insisted as part of the interagency review of these licenses that these conditions be included on the licenses. In all of these eight campaigns, the exporters believed they could perform the foreign launch solely under the authority granted by the Commerce license, and none obtained a State license to perform technical assistance related to conducting the launch campaign.<sup>11</sup> All eight of these campaigns were licensed by Commerce before 1997. In 1997, under pressure from DOD and State, Commerce began to regularly include these safeguards.

<sup>11</sup>The shared jurisdiction over technical data needed to integrate a satellite to a launch vehicle led to some confusion over the boundaries of what was controlled by Commerce as "form, fit, and function" data and whether a separate State license for technical assistance was needed.

**Table 3: Launch Campaigns Licensed Without Three Safeguards, 1989 – February 1999**

Licensed launch campaign	Agency that licensed satellite	Country of launch provider	License final action date	License conditions			Comments
				Comply with security agreement	Monitors and reimbursement required	Technology control plan required	
Apstar 2	Commerce	China	Feb. 1994	No	No	No	Launch and meetings not monitored.
Faisat 1	Commerce	Russia	Mar. 1994	No	No	No	Air Force personnel did attend launch activities. DOD monitoring officials said, however, that the Air Force personnel were not from and did not report to DOD's monitoring program.
Optus B3	Commerce	China	May 1994	No	No	No	Though not required by the export license, DOD monitored the launch and many, if not all, technical meetings using DOD funds.
Echostar 1	Commerce	China	Aug. 1994	No	No	No	Though not included as a license requirement, the exporter did prepare a technology control plan for the launch campaign and paid for DOD monitors at the launch. According to the exporter, DOD also monitored some technical meetings.
Echostar 2	Commerce	China	Aug. 1994	No	No	No	Launch canceled.
Apstar 1A	Commerce	China	June 1995	No	No	No	Launch and meetings not monitored.
Chinasat 7	Commerce	China	Feb. 1996	No	No	No	Launch and meetings not monitored.
Chinastar	Commerce	China	Feb. 1996	No	No	No	Though not included as a license requirement, DOD monitored the launch (but not earlier technical meetings) because the exporter offered to pay the monitors' expenses.

Source: GAO analysis based on Commerce and State licensing records.

Commerce also omitted these safeguard conditions for five additional launch campaigns before 1997, but exporters in these five campaigns also obtained a State license, which did include the safeguard conditions (see

table 4). Commerce officials said that these license conditions were not omitted because of the corresponding State license requirements. In fact, they said they are often unaware of related State licenses when processing an application. While not all launch campaigns require a State technical assistance license, in each of these cases, the exporter did obtain a State license to conduct the launch campaign. State, acting independently from Commerce, granted licenses that included the safeguards as license conditions and required them to be in place for these launch campaigns.<sup>12</sup>

**Table 4: Launch Campaigns That Included Safeguards Only in State Department Licenses**

Licensed launch campaign	Country of launch provider	Date	Licensing agency	License conditions		
				Comply with security agreement	Monitors and reimbursement required	Technology control plan required
Astra 1F	Russia	Sept. 1994	Commerce	No	No	No
		Sept. 1993	State	Yes	Yes	Yes
Apstar 2R	China	Dec. 1995	Commerce	No	No	No
		Jan. 1996	State	Yes	Yes	Yes
Mabuhay	China	Feb. 1996	Commerce	No	No	No
		Feb. 1996	State	Yes	Yes	Yes
Asiasat 3	Russia	Sept. 1996	Commerce	No	No	No
		Sept. 1993	State	Yes	Yes	Yes
Astra 1G	Russia	Oct. 1996	Commerce	No	No	No
		Sept. 1993	State	Yes	Yes	Yes

Source: GAO analysis based on Commerce and State licensing records.

**Reasons for Not Requiring the License Safeguards**

Shortly after Commerce assumed licensing responsibility for some commercial communications satellites in 1992, it implemented policies on license requirements that did not require DOD monitors at technical meetings or development of technology control plans.<sup>13</sup> Commerce officials said that up until sometime in 1996, the Department held to this policy

<sup>12</sup>As in the cases cited in table 3, State and DOD did not require that these three safeguards be made part of these licenses during the interagency review of these licenses.

<sup>13</sup>In the first launch campaign licensed by Commerce in 1994, Asiasat 2, the agency imposed the same safeguards as State required in its licenses. After this campaign, however, it implemented its own policies.

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because it believed that exporters should not be required to reimburse the U.S. government for the cost of monitoring launch campaigns. These officials said that such charges were considered to be the same as export fees, and Commerce, under the Export Administration Act, is prohibited from charging a fee in connection with submitting or processing an export application. Commerce did include as part of its licensing conditions the U.S. government's right to monitor the launch and the technical meetings but did not require the government to monitor the launch or require exporters to reimburse the government for the costs of monitoring. DOD did not have staff and funding resources dedicated to monitoring and, consequently, DOD did not monitor launch campaigns where reimbursement was not a requirement.<sup>14</sup>

Commerce also did not always include license conditions requiring technology transfer control plans. Commerce believed that the basic technical data needed to integrate a satellite with a launch vehicle did not require an export license.<sup>15</sup> Because Commerce did not require a license for the export of the basic technical data, it believed that an exporter did not need to develop a technology control plan to protect data that did not require a license.<sup>16</sup> Commerce's approach in these cases did not address the need to ensure that exporters did not transfer technical data beyond what was allowed for export under Commerce's jurisdiction. While Commerce did not explicitly require compliance with the technology safeguards agreements, it did include license conditions that described the limits of technical data exchange and the required physical security procedures.

DOD and State officials stated that during the interagency review of Commerce export licenses, they did not consistently recommend that Commerce include all the license conditions that State had used because they assumed that these requirements would be added to State-issued licenses authorizing the export of technical data for these launch campaigns. Nevertheless, the satellite exporters in the eight cases where conditions were omitted did not obtain separate State technical assistance

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<sup>14</sup>Problems with DOD's support and funding of the monitoring program are discussed in the Senate Select Committee on Intelligence's report, Report on Impacts to U.S. National Security of Advanced Satellite Technology Export to the People's Republic of China (Washington, D.C.: Government Printing Office, May 1999).

<sup>15</sup>Commerce advised exporters that the basic technical data used to integrate a satellite to a launch vehicle-- "form, fit, and function" data—could be exported without an export license.

<sup>16</sup>State routinely required exporters to obtain a license for the export of technical data needed to carry out the launch campaign.

licenses. The export licenses issued by Commerce enabled the exporter to conduct those launch campaigns without obtaining a State license. In about 1995, DOD recognized that safeguards had not been included on some Commerce licenses and in 1997 reached an agreement with Commerce on a standard set of conditions that included requirements for DOD monitors, technology control plans, and adherence to the technology safeguards agreements.

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**Impact of Omitted Safeguards Unclear**

Though it was not required, DOD did monitor the launch activities for three of the eight launch campaigns licensed by Commerce that did not contain all of the safeguards. As noted in table 3, the exporter voluntarily paid for DOD's expenses to monitor two launches, and DOD paid the cost on a third.<sup>17</sup> However, pre-launch technical meetings were not monitored in every case, and these technical meetings can involve discussions of sensitive technology.<sup>18</sup> DOD officials stated that they did not know whether unauthorized transfers of controlled technology occurred at these and other unmonitored meetings and launches because they were not present. A report on satellite exports to China by the Senate Select Committee on Intelligence noted that unmonitored launch campaigns and meetings provided China with opportunities to collect technical information and that China likely took advantage of these opportunities. It also noted that it is extremely unlikely that the U.S. government would be aware of any technology transfer unless it was fortunate enough to detect evidence through other channels.

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**Possible Unauthorized Technology Transfers and Export Violations Reported**

Monitoring problems and unauthorized transfers of technology and violations of export control regulations may have occurred on 14 campaigns to launch U.S. commercial communication satellites using Chinese, Russian, and Ukrainian launch vehicles. Two of the cases raised U.S. national security concerns. These problems were partly caused by confusion created by the lack of clarity about the roles and responsibilities of each agency in licensing and monitoring these exports and partly by

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<sup>17</sup>As noted in table 3, the Echostar 2 satellite licensed for launch in China was subsequently canceled.

<sup>18</sup>According to Lockheed-Martin, some technical interface meetings on Echostar 1 were apparently monitored because the company agreed to schedule these meetings in conjunction with Asiasat 2 meetings that were required to be monitored. According to the exporter, DOD did monitor all technical meetings on the Optus B3 campaign. DOD monitors, however, stated that they do not believe that all technical meetings were monitored.

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companies' apparent failure to establish effective controls and procedures to ensure compliance with U.S. export regulations.

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**Possible Violations of Export Control Regulations Raise National Security Concerns**

Monitoring problems, possible violations of export control regulations, and unauthorized transfers of technology have been found or are under investigation by State, Customs, and the Department of Justice on 14 launch campaigns involving China, Russia, and Ukraine. These problems range from concern about unmonitored meetings to the transfer of technology that DOD and State determined raise U.S. national security concerns and highlight the importance of both requiring licensing safeguards and a coordinated approach to their effective implementation. Appendix I summarizes the launch campaigns where compliance issues have been identified or are under investigation.

In two launch campaigns, DOD and State concluded that the unauthorized release of technical information by U.S. satellite companies raised national security concerns. During the Apstar 2 and Intelsat 708 failure investigations in 1995 and 1996, Hughes Space and Communications Company and Space Systems Loral allegedly provided information to China that could be used to improve the design and increase the reliability of its launch vehicles and ballistic missiles. In a third launch campaign, Asiasat 2, Martin Marietta Aerospace provided assistance to China on its newly developed satellite kick motor. This transfer, according to State officials, did not significantly harm national security but could allow China to focus its research efforts and apply U.S. technology to its ballistic missile programs. State is continuing its investigation of this case.

State, Customs, and Justice are now reviewing or investigating other launch campaigns, and it is unclear whether unauthorized technology was transferred. Among the incidents involving launch campaigns using Chinese, Russian, and Ukrainian launch vehicles are the following:

- A U.S. company reportedly assisted China by providing consulting services, including analyzing satellite test results, without a valid export license and without DOD oversight. State is currently investigating this case and has also referred the matter to Customs for investigation.
- The U.S. company COMSAT may have provided technical assistance controlled on State's Munitions List to an Asian satellite operator without authorization. State has referred this matter to Customs for criminal investigation.

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- Boeing's Sea Launch company, a joint venture business using Ukrainian launch vehicles, was charged by State with 207 violations of export control regulations for exporting technical data without authorization. In September 1998, State and Boeing signed a consent agreement that included \$10 million in penalties.
- Lockheed Martin obtained an export license to perform a failure review after the failure of a Russian launch vehicle to properly place a satellite into orbit. A European satellite company, however, participated in the review and analysis without authorization from State. State is continuing to investigate this case.

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**Poor Agency Implementation Causes Problems**

Effective implementation of the policy limiting technology transfer on foreign launches outlined in the government-to-government technology safeguards agreements requires a coordinated and consistent approach by the export licensing agencies and DOD in monitoring the implementation of the policy. As we noted previously, the agencies involved in licensing and monitoring launch campaigns have, at times, implemented different policies related to satellite exports and have not effectively coordinated their work.<sup>19</sup> As a result, U.S. government controls over sensitive technical data differed, support for effectively implementing the government-to-government technology safeguards agreements was inconsistent, and Commerce and DOD may have acted outside their authorities.

- Commerce and State shared export-licensing jurisdiction for the technical data needed to launch a satellite but did not establish clear jurisdictional boundaries over this data. Commerce's policy for controlling technical data differed from DOD and State policies. Commerce did not require a license for technical data transfers in cases where State would have required a license. The different approaches on controlling technical data made the U.S. government policy on controlling this data unclear and made it difficult for DOD monitors to know what technical data could be released.
- Commerce, State, and DOD policies and decisions were not consistent in supporting license conditions needed to implement the technology safeguards agreements.

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<sup>19</sup>State's and Commerce's split jurisdiction over stealth-related exports has also created concerns. See [Export Controls: Concerns Over Stealth-Related Exports](#) (GAO/NSIAD-95-140, May 10, 1995).

- Until 1997, Commerce did not consistently support the requirement for DOD monitors at launches and technical meetings. Commerce did include license conditions granting DOD the right to monitor technical meetings and overseas launches but did not require companies to reimburse DOD for the cost of monitoring. Commerce also did not consistently require exporters to prepare and use technology transfer control plans. The U.S. authority to oversee and monitor implementation of the plans and to monitor launch operations is granted in the government-to-government technology safeguards agreements.
- State was inconsistent in supporting the provisions of the technology safeguards agreements. While State's Office of Defense Trade Controls consistently required that license conditions include provisions for DOD monitors and technology control plans on all satellite licenses, the State office that reviewed Commerce export licenses did not require Commerce to include similar conditions on all its licenses. This approach to Commerce's licenses also conflicted with the safeguards outlined in the State-negotiated, government-to-government technology safeguards agreements.
- DOD reviewed Commerce export license applications but did not consistently recommend that license conditions be added that would require DOD monitors or technology control plans for all satellite export licenses.
- DOD's launch monitoring activities were not effectively coordinated with the export licensing agencies.
- DOD monitors did not routinely report on their work to State and Commerce or keep records of their monitoring activities. Commerce and State officials said they were unaware of many of the problems that DOD monitors identified because they were not routinely informed of the results. The Senate Select Committee on Intelligence reported that incomplete record-keeping prevented the Committee from understanding which technical meetings were or were not monitored.
- Neither Commerce nor State reviewed DOD's monitoring activities. State officials said they had not actively monitored or overseen DOD's work because DOD was responsible for monitoring overseas launch campaigns, and Commerce officials said that Commerce does not perform on-site monitoring for any of its exports. Consequently, it was not until after the investigation of the 1996 Intelsat failure review that State and Commerce learned of the problems in DOD's monitoring program and the numerous problems in other launch

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campaigns, including foreign insurance companies being provided sensitive technical data during overseas launches.

- DOD monitors may have provided exporters with advice on whether certain activities required an export license without informing Commerce and State. While monitors are expected to ensure that technical discussions and other activities are consistent with the terms of an existing license, only State and Commerce had the legal authority to make decisions on whether activities not previously authorized require a license or can be performed without a license. DOD monitors may have provided licensing advice to companies that contributed to the problems being reviewed in three launch campaigns (Optus B2, Asiasat 2, and Asiasat 3).
- Commerce did not inform State or DOD of a key export approval decision relevant to these agencies and to national security. In 1995, Commerce told Hughes Space and Communications Company that it could release its Apstar 2 launch-failure report to China without an export license. Commerce took this action without informing DOD or State, even though this data involved the Chinese launch vehicle and was clearly under State's jurisdiction.

Despite these past and ongoing problems, State, Commerce, and DOD officials said they have not developed an interagency agreement on how to address these issues to ensure that U.S. policy on safeguarding sensitive technologies used in foreign launches is consistently implemented.<sup>20</sup> State officials agreed that guidelines defining the roles and missions of each agency in implementing this policy would help prevent problems in the future. Commerce and DOD officials noted that while they have coordinated on developing a standard set of license conditions and other issues (for example, the agencies routinely meet to discuss export applications), this coordination was limited and has not effectively prevented the problems we noted.<sup>21</sup>

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<sup>20</sup>Commerce will remain involved in future launch campaigns because, while licensing jurisdiction officially shifted to State in March 1999, satellite export applications that Commerce received before the change and subsequently approved remain valid for up to 2 years.

<sup>21</sup>A Commerce official said that coordination with State has been hampered at times because many different parts of State are involved in the process. State's Bureau of Political Military Affairs oversees the Office of Defense Trade Controls and export licensing for munitions-related items while the Bureau of Nonproliferation coordinates with Commerce on dual-use export licenses.

<b>Company Actions and Lax Controls</b>	<p>Some of the problems being investigated by State and Customs are attributable to company actions and lax company controls and procedures to prevent unauthorized exports. In 1992 and 1995, Hughes participated in accident investigations of the Optus B2 and Apstar 2 launch failures in China and provided China with technical assistance on how to correct the identified problems. In 1996, Loral and Hughes participated in an accident review of the failed launch of an Intelsat satellite on a Chinese launch vehicle and provided technical advice on the cause of the launch vehicle failure. In none of these three cases did the companies request or obtain the required State export license authorizing such work. In other cases being investigated, the companies' organization and procedures may have been ineffective in ensuring that the companies followed export regulations. State attempted to address these lax controls in its Boeing Sea Launch settlement by requiring the company to make organizational changes in its internal oversight of exports and allowing Boeing to pay \$2.5 million of the \$10 million in penalties on internal control improvements at the company. In another case, Lockheed Martin agreed to restructure its internal export compliance procedures as part of a voluntary disclosure to State of problems in one of its launch campaigns.</p>
<b>Recent Legislative Changes Address Some Export Licensing Problems</b>	<p>Legislative changes to satellite export controls were passed in 1998 to ensure that the licensing process more consistently addresses national security considerations. While these changes address some causes of past export licensing problems, they do not fully resolve the implementation problems by State, Commerce, and DOD of licensing and oversight policies to safeguard satellite exports. Also, State, DOD, and industry officials have identified potential difficulties regarding the establishment of a monitoring division at DOD. License processing times for satellite exports may also increase.</p>
<b>Satellite Export Controls Changed Due to the Transfer of Controlled Technology</b>	<p>On October 17, 1998, Congress passed legislation that changed export controls over commercial communications satellites. The legislation's key provisions, as implemented by State and Commerce in regulations, include:</p> <ul style="list-style-type: none"><li data-bbox="595 1657 1428 1721">• transferring commercial communications satellite export licensing authority from Commerce to State beginning March 15, 1999;</li><li data-bbox="595 1721 1199 1752">• consolidating control of technical data at State;</li><li data-bbox="595 1752 1428 1816">• requiring a DOD-approved technology transfer control plan for all satellite export licenses;</li></ul>

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- creating the Space Launch Monitoring Division at DOD with 42 staff dedicated to supporting the monitoring of foreign launches of U.S. satellites;
- requiring DOD monitoring of a broader range of activities, including technical discussions and satellite processing and launch activities and requiring the license holder to reimburse DOD's entire monitoring costs; and
- requiring licenses for investigations of crashes of U.S. satellites launched in foreign countries.

Congress made these changes partly in response to concerns about the 1996 transfer of licensing authority for exports of commercial communications satellites from State to Commerce. Congress was concerned that the transfer had resulted in weakened U.S. government procedures and controls on the flow of militarily sensitive technology to countries of proliferation and national security concerns, such as China.

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#### Legislative Changes Address Some Licensing Problems

The recent legislative changes will address some of the apparent causes of the export licensing problems on overseas launches of commercial communications satellites. For example, transferring satellite-licensing authority to State from Commerce for license applications received after March 15, 1999, will address any confusion created by shared jurisdiction over these exports and help ensure that satellite-related exports are reviewed and treated as sensitive Munitions List items. Consolidating export control responsibility at State should remove ambiguity over the control of technical data, since State has consistently required a license for technical data and assistance related to each satellite export. State has also consistently applied safeguards, including requiring DOD monitors at the launch, to export licenses. Furthermore, according to a senior State official, under the new regulations implementing the legislative changes, all Commerce satellite license applications received before the change in jurisdiction on March 15, 1999, will be subject to State's stricter controls on technical data.<sup>22</sup>

The impact of legislating the monitoring of crash investigations is less clear, since this is not a new requirement. State and DOD officials noted

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<sup>22</sup>A State official also said State is reviewing and will revoke past jurisdiction determinations State has made that gave Commerce licensing jurisdiction over some space-related commodities to reflect the recent legislative changes.

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that investigations of satellite launch crashes are considered defense services under State regulations and have always required a State Department license.

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**Legislative Changes Will Not Fully Address Other Problems**

The recent legislative changes do not fully address the implementation problems in approving and monitoring commercial communications satellite exports. While the changes have consolidated export authority at State, additional interagency coordination is still necessary for the implementation of the safeguards on previously licensed Commerce exports and State licensed exports. In implementing the legislative changes, the agencies have not reached an agreement on what role each agency will play in monitoring overseas launches, which agency will provide licensing guidance to exporters, or how the agencies will coordinate their oversight of any future launch failures. Further, State and DOD have not established a formal mechanism for distributing monitors' reports to licensing officials or clearly identified and defined the roles of U.S. embassy staff in China, Russia, Ukraine, and Kazakhstan that will support the exercise of U.S. rights under the technology safeguards agreements. Additionally, coordination within State concerning the treatment of export licenses issued by State for Munitions List items with the comments State provides on Commerce licenses has not been addressed and may remain a problem. Dual-use export licenses are reviewed by State's Bureau of Nonproliferation while Munitions List licenses are managed by State's Bureau of Political Military Affairs.

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**Establishment of New DOD Monitoring Organization May Face Difficulties**

The establishment of an organization at DOD with permanent staff to monitor launch campaigns should improve the U.S. government's monitoring and oversight of these exports.<sup>23</sup> While establishment of the monitoring group is a positive step, DOD, State, and industry officials have identified the following potential difficulties in the effective implementation of the changes in monitoring.

- The monitoring organization is still being created. DOD's initial plans called for two-thirds of the monitors to be active duty military personnel. Current plans are to have all civilian monitors. DOD and State officials are concerned that DOD may be unable to recruit and

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<sup>23</sup>According to DOD officials, monitors in the new organization will be clearly instructed not to provide licensing advice to exporters as monitors have done in the past.

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retain qualified civilian staff with the knowledge and expertise necessary to conduct technical monitoring.<sup>24</sup> Active duty military personnel may also be more familiar with the technologies that DOD would like to protect.

- The number of monitors available may be insufficient. The legislative changes, as implemented, have expanded the DOD monitors' responsibilities to all phases of the launch campaign. Monitoring requirements may now apply to all the various stages of the launch campaign, including interactions between the satellite manufacturer, component supplier, launch provider, and satellite user. Industry officials have expressed concern that the number of monitors may not be adequate to cover the broadened scope of activities that now require the presence of DOD monitors.<sup>25</sup>

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**License Processing Times Likely to Increase**

The March 15, 1999, change in licensing jurisdiction from Commerce to State will likely lengthen processing times for satellite licenses. Longer processing times at State are likely due to additional controls in State's licensing system. For example, satellite-related export items under State's licensing jurisdiction are subject to trade sanctions imposed against nations that spread missile technology.<sup>26</sup> In addition, unlike Commerce, State must notify Congress of any proposed export of defense articles and defense services valued at \$50 million or more, including satellites. Congress has 30 days in which to review license applications and raise any objections. However, this process may take longer than 30 days because State routinely briefs congressional staff on proposed exports before sending a formal notification to Congress. These briefings and the notification may be further delayed due to the congressional schedule and other political considerations.

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<sup>24</sup>DOD officials cited issues such as heavy travel schedules and lengthy stays in unfavorable locations as reasons for potentially high turnover rates among DOD monitors.

<sup>25</sup>Industry officials have also raised concerns about the requirement to reimburse DOD for monitoring. Citing the increased number of activities requiring monitoring and the likely number of monitors necessary to perform these duties, industry officials are concerned that reimbursement costs might become prohibitive and expressed reservations about paying some overhead costs such as training.

<sup>26</sup>In 1991 and 1993, the United States imposed Missile Technology Control Regime-related sanctions on China for selling missile equipment to Pakistan. While in force, these sanctions prohibited the export of State-licensed satellites to China.

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Our analysis of 29 satellite export license applications submitted between 1993 and 1998 shows that processing times averaged 144 days at Commerce and 244 days at State.<sup>27</sup> Some of the difference in processing times appears attributable to the congressional notification requirement for State export licenses. For the one State export license where data was available for review, 84 days were attributable to the congressional notification requirement. While less than State's, Commerce's average processing times for satellite export licenses did not meet the 90-day time requirement for ruling on license applications set by a 1995 executive order on the administration of export controls.<sup>28</sup>

Additional delays in license processing times for satellites may be expected because State has not provided its Office of Defense Trade Controls with adequate resources to perform its expanded mission. In a June 1999 report, State's Office of Inspector General found that inadequate resources have made it increasingly difficult for State's Office of Defense Trade Controls to manage the Munitions List licensing process. The report notes that the office is understaffed and export licensing officers are paid less and expected to do more than comparable staff at DOD and Commerce. According to the report, since 1993 license processing times have more than doubled, and these increased times have hurt U.S. businesses, which are forced to wait for licenses. The Inspector General's report recommended that State provide the Office of Defense Trade Controls with resources to hire additional staff to address increased workloads and make the pay structure for licensing officers comparable to other agencies. State officials indicated that as of July 1999, it planned to provide funds for hiring about 17 additional staff--6 fewer positions than requested by the Office of Defense Trade Controls. Moreover, the hiring of additional staff could take 6 months or longer, and State does not plan to increase the pay structure of its licensing officers. After an internal study of the issue, State concluded that its licensing officers are appropriately compensated.

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<sup>27</sup>We calculated processing times for 26 Commerce and 3 State satellite export licenses involving launches by China and Russia. Processing time data was not available for all 43 launch campaigns examined in this report. In reviewing the China export licenses, we included only satellite export licenses for which each agency was responsible for obtaining a waiver to the Tiananmen Square sanctions on satellite exports to China. Satellite licenses issued by Commerce for which Tiananmen waivers were obtained through State were not included in our analysis.

<sup>28</sup>Executive Order 12981, December 5, 1995.

## Conclusion

Given the scope, complexity, and shared responsibility in implementing export controls on the use of foreign launch vehicles, the agencies' differing policies and, at times, the ineffective implementation of these policies were critical flaws that contributed to many of the problems now being investigated. While the recent legislative changes will improve controls over such exports, effective interagency implementation is still needed to help ensure that safeguards are in place and sensitive technology is not improperly released in the future.

## Recommendation

We recommend that the Secretary of State consult with DOD and Commerce for the purpose of establishing clear roles and responsibilities for all agencies and overseas posts in implementing the government-to-government technical safeguards agreements and ensuring compliance by U.S. exporters with U.S. satellite export regulations.

## Agency Comments and Our Evaluation

The Departments of State and Commerce provided written comments on a draft of this report (see apps. II and III, respectively). DOD reviewed a draft of this report but did not take an overall position on its content. DOD, State, and Commerce provided technical comments, which we incorporated where appropriate.

State concurred with our report and the recommendation to improve interagency coordination on managing satellite exports. Commerce, however, said that the 1996 change in licensing jurisdiction resolved the interagency problems we identified and noted that the congressional decision to return export licensing jurisdiction for satellites to State in 1999 has adversely affected U.S. industry. We do not agree that the 1996 transfer of jurisdiction resolved the problems we identified. The agencies' differing policies and, at times, poor coordination and implementation of U.S. government policy were critical flaws in the process that contributed to many of the problems now under investigation. Further, the shared jurisdiction over technical data that continued after the 1996 transfer of jurisdiction for satellites to Commerce contributed to the confusion by some satellite exporters over which agency controlled technical data and what U.S. government policy was on these exports.

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Our report notes that the return of jurisdiction to State may lengthen licensing processing times for exporters. This is due to congressional notification requirements and the fact that State has not allocated sufficient resources to its Office of Defense Trade Controls to process export licenses in a timely manner. Commerce cited several reports that exporters have already experienced negative financial consequences from the return of licensing jurisdiction to State. Although we have not verified these reports, recent data on licensing process times provided by State raise questions about the extent of any problems caused by the change in jurisdiction.<sup>29</sup> To the extent these reports are accurate, they reinforce our observation that implementation is critical to effective satellite export control policies and that adequate staff resources are essential for State to manage the additional workload associated with the transfer in jurisdiction for satellite exports.

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As agreed with you, we plan no further distribution of this report until 30 days from the date of its issuance, unless you publicly announce its contents earlier. At that time, we will send copies of this report to other congressional committees; the Honorable William S. Cohen, Secretary of Defense; the Honorable Madeleine K. Albright, Secretary of State; the Honorable William M. Daley, Secretary of Commerce; and the Honorable Jacob Lew, Director, Office of Management and Budget. Copies will also be made available to others upon request.

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<sup>29</sup>According to State, the only two satellite export licenses that were submitted and processed between March 15, 1999, and August 20, 1999 (the first 6 months after the transfer) and that required notification were processed and formally notified to Congress in 49 and 131 days. As our report notes, processing times at Commerce for satellites averaged 144 days. These two satellite cases may, however, underestimate the actual average processing time since the data does not reflect cases that were still under review as of August 20, 1999.

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If you or your staff have any questions concerning this report, please call me at (202) 512-4128. Key contacts and staff acknowledgments are listed in appendix V.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Harold J. Johnson".

Harold J. Johnson  
Associate Director  
International Relations and Trade Issues

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#### **Abbreviations**

DOD      Department of Defense

# Possible Export Control Violations Under Review and Related Monitoring Issues

Department of State and Defense (DOD) documents show that possible violations of export control regulations may have occurred and related monitoring concerns have been raised on 14 launch campaigns involving Chinese, Russian, and Ukrainian launch vehicles licensed between 1989 and February 1999. These problems and issues included unauthorized transfers of technical information to China that could improve its launch vehicles and missiles as well as unmonitored technical meetings between U.S. satellite companies and foreign launch providers. In addition, insurance companies may have been provided with controlled technical data on an unknown number of launch campaigns. State and Customs are investigating several of these cases to determine exactly what information may have been released. Table I.1 lists these cases.

**Table I.1: Launch Campaigns With Possible Technology Transfer, Licensing, or Monitoring Issues, 1989- February 1999**

Satellite program	Launch provider	Technology transfer/export licensing issue	Comments
APMT	China	Hughes Electronics Corporation (Hughes) requested and received approval for a dual citizen of Canada and the People's Republic of China to work on the Asia Pacific Mobile Telecommunications satellite project in California. Not reported by Hughes in its application or detected by State in its review of the license application was that this person was also reportedly the son of a senior Chinese military official responsible for China's military satellite programs and was directly involved in the APMT project. After learning of this connection to the Chinese military, State suspended the export license.	State officials said that no sensitive technology was released. In 1999, Commerce notified Hughes that it would deny its license application request to export satellites to the APMT project.
Apstar 1A	China	DOD did not monitor technical interface meetings or the launch. The satellite export license issued by Commerce did not require DOD monitors at either the launch or during technical interface meetings.	DOD officials cannot make assurances that no unauthorized transfers occurred because DOD monitors were not present.

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**Appendix I**  
**Possible Export Control Violations Under**  
**Review and Related Monitoring Issues**

Satellite program	Launch provider	Technology transfer/export licensing issue	Comments
Apstar 2	China	<p>Hughes Space and Communications Company (Hughes) conducted a failure review with China of the 1995 failed launch of the Apstar 2 satellite. Hughes informed Commerce of its actions but did not obtain a State license to conduct a failure review nor did Hughes advise State or DOD of its actions. Hughes' launch-failure review activities were conducted without DOD monitors. Hughes requested and received Commerce approval to release at least some of its analyses of the launch failure (analyses that demonstrated problems with the launch vehicle's fairing) to China.</p> <p>DOD did not monitor technical interface meetings or the launch. The Chinese launch vehicle exploded after launch, destroying the rocket and the satellite.</p>	<p>Defense and State both reviewed the technical assistance provided by Hughes to China during its failure review work and concluded that the transfer raised U.S. national security concerns. Both agencies agreed that the activities undertaken by Hughes were a "defense service" regulated by State. Commerce officials admitted that approving the release of the technical information was a mistake since such exports are under State's authority. State concluded that the information provided during the accident review to China was more detailed than that provided during the Intelsat 708 review and served as a tutorial for the Chinese in areas where their spacelift program was weak. State and the Department of Justice are currently investigating this case.</p> <p>DOD officials cannot make assurances that no unauthorized transfers occurred during the pre-launch technical meetings or at the launch since they were not present.</p>
Asiasat 2	China	<p>Martin Marietta Aerospace assessed a Chinese company's testing of a kick motor to be used to place the satellite into orbit. Martin Marietta did not obtain an export license to carry out work on the kick motor and faxed and mailed 10 copies of the unedited analysis of the Chinese kick motor to its Chinese satellite customer prior to DOD review. DOD monitors may have advised Martin Marietta that some of this work with China on its kick motor was permitted, and DOD monitors attended a meeting on the kick motor in China. Company officials also said that this work was permitted under a Commerce export license.</p>	<p>According to State officials, State reviewed the impact of this technology transfer and found that it represented a loss of technology but did not significantly harm national security. The transfer reportedly would allow China to focus its research efforts, and this information may have applications to its ballistic missile programs. State officials indicated that an export license was required for this work, and it is continuing the investigation.</p>
Asiasat 3	Russia	<p>After the failure of the launch vehicle to properly place the satellite into orbit, the Russians performed a launch-failure review. Lockheed Martin requested and received an export license from State to participate, on a limited basis, in the review. However, a European satellite company participated in the Lockheed Martin failure review analysis of the launch failure and did not have an export license to do so. DOD monitors may have advised the European company that it could participate in this failure review, largely reviewing and assessing the Russian findings, under certain restrictions without a State license.</p>	<p>State officials believe that the European company needed an export license to participate in the failure review. They are, however, continuing their investigation into this case to determine where technical discussions were held and exactly what types of technical discussions the company participated in.</p>

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**Appendix I**  
**Possible Export Control Violations Under**  
**Review and Related Monitoring Issues**

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Satellite program	Launch provider	Technology transfer/export licensing issue	Comments
		The U.S. satellite operator COMSAT may have provided technical assistance to an Asian satellite operator without authorization. The company may have also passed technical information from the Asiasat 3 failure review to Asiasat, a Hong Kong-based company partially owned by the Chinese government.	State has referred this matter to the U.S. Customs Service for criminal investigation and possible prosecution by the Department of Justice.
Astra	Russia	Lockheed Martin voluntary disclosed to State the release of controlled information and the holding of technical meetings before a signed agreement was returned to State. These violations were largely technical in nature.	Lockheed Martin realigned its internal control procedures and practices to ensure future compliance with export control regulations.
Chinasat 7	China	DOD did not monitor the launch or technical interface meetings. The satellite export license issued by Commerce did not require DOD monitors at either the launch or during technical interface meetings.	DOD officials cannot make assurances that no unauthorized transfers occurred since they were not present.
Chinastar	China	DOD did not monitor technical meetings but did monitor the launch. The satellite export license issued by Commerce did not require DOD monitors at either the launch or during technical meetings. Lockheed Martin requested and paid for a DOD monitor to attend the launch.	DOD officials cannot make assurances that no unauthorized transfers occurred because DOD monitors were not present.
		A U.S. company reportedly assisted China by providing consulting services, including analyzing satellite test results and performance measures. Though the company had applied to State for a license, and this request had been tentatively approved, the license was apparently never finalized and made valid because the company never completed a technology transfer control plan. DOD officials also indicated that the company never submitted any technical documents for clearance for release to China.	DOD monitors, while monitoring Lockheed Martin's activities at the launch site, first encountered officials from this U.S. company at technical meetings. DOD monitors were forced to stop at least two meetings because the company's officials allegedly were providing information beyond what was allowed in the government-to-government safeguards agreement. State is currently investigating this case and has referred the matter to the U.S. Customs Service for investigation.
Echostar 1	China	The satellite export license issued by Commerce did not require DOD monitors at either the launch or during technical meetings. According to Lockheed Martin, DOD did monitor some prelaunch technical meetings. Lockheed Martin reportedly paid for a DOD monitor to attend the launch.	DOD officials cannot make assurances that no unauthorized transfers occurred during unmonitored pre-launch technical meetings because DOD monitors were not present.
Faisat 1	Russia	The satellite export license issued by Commerce did not require DOD monitors at either the launch or during technical meetings. U.S. Air Force personnel did attend launch activities.	DOD monitoring officials stated that while Air Force personnel attended the launch activities, they were not from and did not report to DOD's monitoring program. DOD officials cannot make assurances that no unauthorized transfers occurred because DOD monitors were not present.

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**Appendix I**  
**Possible Export Control Violations Under**  
**Review and Related Monitoring Issues**

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<b>Satellite program</b>	<b>Launch provider</b>	<b>Technology transfer/export licensing issue</b>	<b>Comments</b>
Intelsat 708	China	Space Systems Loral and Hughes participated in an independent review of the causes of the 1996 catastrophic failure of the Chinese Long March 3B launch vehicle. Neither company applied for an export license to perform this work. The review committee's charters included making an independent assessment of the cause of the failure and providing recommendations to the Chinese launch provider. Insurance companies pressured China into having an independent western review of the causes of the failure, and China requested Loral and Hughes to participate.	Both Defense and State concluded that the unauthorized transfers of technology had direct applicability to China's military systems, including its ballistic missile programs and raise U.S. national security concerns. Space System Loral and Hughes are under investigation by the U.S. Customs Service and the U.S. Attorney's Office for the District of Columbia.
Optus B2	China	Hughes conducted a failure review of the 1992 failure of the Long March 2E launch vehicle. DOD monitors may not have been present at all meetings with Chinese officials and may have advised Hughes that it could perform some work without a new State license. One technical paper pointing to the cause and indicating what could be done to fix the problem may have been released to China without DOD review and approval. According to the exporter, DOD monitors attended all technical meetings and authorized the release of technical information given to the launch provider.	According to State, because it is unclear what information was provided to China, no assessment of national security harm could be performed. State and the Department of Justice are currently investigating this case.
Optus B3	China	The satellite export license issued by Commerce did not require DOD monitors at either the launch or during technical meetings. Nevertheless, DOD monitored many technical meetings and sent a monitor to the launch, exercising its option of paying for the cost of monitoring.	According to the exporter, DOD monitored all technical meetings. Documentation indicates that DOD did monitor many of the technical meetings. However, DOD monitors stated that they do not believe that all technical discussions were monitored. Some pre-launch meetings included discussions of changes being made to the launch vehicle's fairing. These changes were being made in response to the Optus B2 accident review and pressure by Hughes to fix the problem. State is reviewing this case as part of its overall investigation of the Optus B2 and Apstar 2 launch campaigns.
Sea Launch	Ukraine	The Boeing Company exported technical data before an export license was requested and approved and without DOD review. State documents indicate that technical data was also exported that was outside the scope of the subsequently approved licenses, and the company did not notify DOD of all technical meetings. State charged the company with 207 violations of the export control regulations.	State officials stated that these violations did not impact national security. The technical data involved was generally of foreign origin. In September 1998, State and Boeing signed a consent agreement that assessed Boeing \$10 million in penalties and required Boeing to establish a more rigorous compliance program including assigning export compliance responsibility to Boeing's Office of General Counsel and Executive Counsel. Of the \$10 million in penalties, \$2.5 million could be spent on the company's improved compliance program. The Department of Justice is conducting a criminal investigation into this case.

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**Appendix I**  
**Possible Export Control Violations Under**  
**Review and Related Monitoring Issues**

<b>Satellite program</b>	<b>Launch provider</b>	<b>Technology transfer/export licensing issue</b>	<b>Comments</b>
Multiple	Various	As part of many launch campaigns, insurance companies have been given controlled technical data without an export license. The satellite makers would provide data on the satellite and launch vehicle in order to obtain insurance for their launch. The insurance companies are often foreign and may be brokers for numerous international insurance firms. It was pressure from the insurance companies that pushed China into asking Loral and Hughes to participate in the review of the Intelsat VII failure.	State is currently reviewing the business practice of providing controlled technical data to insurance companies and the control of that data by insurance companies. The insurance industry and the space launch/satellite industry are also studying the practices to determine a method in which information can be provided. Conclusions of this study will be reviewed by State.

Source: Compiled by GAO from State and DOD documents.

# Comments From the Department of State



United States Department of State

*Chief Financial Officer*

*Washington, D.C. 20520-7427*

AUG 25 1999

Dear Mr. Hinton:

We appreciate the opportunity to review your draft report, "EXPORT CONTROLS: Better Interagency Coordination Needed on Satellite Exports," GAO/NSIAD-99-182, GAO Job Code 711368.

The Department of State provided technical changes to your staff that were, for the most part, accepted and incorporated in the final document.

State concurs with the report recommendation and will consult with the Departments of Defense and Commerce to clarify the roles and responsibilities of all the agencies to help ensure compliance with U.S. satellite export regulations.

If you have any questions concerning this response, please contact the Director of the Office of Defense Trade Controls at (703) 812-2564.

Sincerely,

A handwritten signature in black ink that reads "Bert Edwards".

Bert T. Edwards

cc: GAO/NSIAD – Mr. Shafer/Mr. Trimble  
State/PM/DTC – Ms. Biancaniello

Mr. Henry L. Hinton, Jr.,  
Assistant Comptroller General,  
National Security and International Affairs,  
U.S. General Accounting Office.

# Comments From the Department of Commerce

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

See comment 1.



**THE SECRETARY OF COMMERCE**  
Washington, D.C. 20230

AUG 17 1999

Mr. Harold J. Johnson  
Associate Director  
International Relations and Trade Issues  
General Accounting Office  
Washington, D.C. 20548

Dear Mr. Johnson:

Thank you for sending me the General Accounting Office's draft report on export licensing of commercial communications satellites. In the enclosed document, I have provided recommendations to expand the report to enhance its accuracy. Although the issue of jurisdiction of satellite licensing responsibilities has been brought to closure for now, I believe your report would benefit if it were expanded to make clear that the President's 1996 decision to complete the transfer of export licensing jurisdiction for communications satellites to the Commerce Department resolved the problems that you identify. The report acknowledges this in a circumspect fashion by noting that the problems were limited to licenses processed before this decision or had nothing to do with the transfer. The report would also benefit from a discussion of the adverse impact on U.S. industry as an unintended consequence of the retransfer of jurisdiction back to the State Department. I have included language that you may wish to consider adding to your report.

I believe that those receiving the report would be better served if the report reflects these modifications.

Sincerely,

  
William M. Daley

Enclosure

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**Appendix III**  
**Comments From the Department of**  
**Commerce**

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**Comments and Recommended Changes - GAO Draft Report/NSIAD-99-182:**  
**"Export Controls: Better Interagency Coordination Needed on Satellite Exports."**

**General Comments**

The draft report compresses a series of events that took place over a decade and during two Administrations in a way that, unfortunately, does not present a complete or accurate description of the conditions of licenses for satellite exports. The conditions placed on satellite licenses involve complex issues and the description contained in the report does not adequately distinguish between those licenses issued before the President's 1996 jurisdictional decision and those issued after it. Moreover, some of the cases the report cites as problems, such as the Boeing Sea Launch program, were wholly unrelated to the transfer of jurisdiction. This fundamental flaw, while producing an outcome that is more supportive of the decision to retransfer jurisdiction, will greatly reduce the accuracy and value of the report if it is not corrected.

See comment 2.

See comment 3.

See comment 4:

See comment 5.

See comment 4.

First, all Commerce licenses included a condition that bound all parties to adhere to the bilateral Technology Safeguards Agreements for satellite launches in Russia and China. The Agreements give the United States the right to monitor all aspects of a satellite launch at any time. What was lacking from the pre-1996 Commerce licenses was a condition that required the U.S. satellite manufacturer to pay for this monitoring. U.S. Government personnel could have monitored any launch approved by Commerce but chose not to, given personnel and cost constraints. After regulations were issued on October 21, 1996, implementing the President's decision to transfer the remaining communications satellites to Commerce jurisdiction, Commerce licenses contained this funding provision.

Second, after the new regulations were published in October 1996, Commerce licenses included conditions that mandated a Technology Transfer Control Plan (TTCP). Commerce and other agencies had not required a technology transfer control plan as part of a Commerce license previous to 1996 because the only technology under Commerce's jurisdiction was that technology identified in the bilateral agreements as releasable to the foreign launch service providers. Commerce licenses restricted the release of all technical data other than "form, fit, and function" information and included all other conditions recommended by other agencies to ensure a consensus for approval of the license application. When the President completed the transfer of communications satellites to Commerce in 1996, his decision also entailed new conditions that led to all data being reviewed by the Department of Defense (DOD) monitors prior to release to the launch service provider.

Since 1996, a technology transfer control plan has been required for Commerce satellite licenses. This plan established requirements and procedures for technology safeguards. The TTCP identified the level and extent of technical data to be released, included plans for securing the satellite during its transportation to the launch site; required that all technical data under the license be reviewed by DOD prior to its release to the launch service provider; required a DOD monitor to be present at technical meetings and launch activities with the Chinese launch service

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provider; instructed the exporter to transport the satellite in a sealed container allowing no access to equipment or technical data; required U.S. monitors to accompany the satellite if it was transported on a non-U.S. aircraft; and required a separate cryptographic equipment safeguard plan for communications security equipment.

See comment 6.

Third, the report should provide more clarity regarding which licenses were from which agency. Many of the examples cited in the "Possible Unauthorized Technology Transfer" section actually involve State Department licenses where the three conditions in question in the report were applicable. The DOD monitoring, TTCP, and technology safeguards conditions did not appear to be effective to the satisfaction of all parties involved even when they were integral to the State Department export license, so there needs to be some recognition that the addition of license conditions alone may not solve all the complex situations that arise with satellite exports.

See comment 7.

It is worth noting that while the report of the Select Committee chaired by Representative Cox takes the two U.S. firms involved in the failure investigations to task for intentionally diverting space technology to the Chinese, it did not find evidence that the Commerce satellite licensing procedures adopted after 1996 were flawed. The alleged leaks occurred prior to 1996 during failure investigations -- one of which occurred under a Commerce Department license and one under a State Department license. This shows that the conditions imposed after 1996 worked well in protecting our national security (see, for example, Page 17 of the Classified Overview).

This point is important, especially when contrasted to the current situation, which has developed as a result of the retransfer. On March 15, 1999, Commerce returned commercial communications satellites to State's licensing jurisdiction as required by the 1998 National Defense Authorization Act. This retransfer of licensing authority has not gone as smoothly as one might have hoped. One satellite firm, for example, announced (in the *Wall Street Journal*) that it would lose as much as \$174 million because of delays in license reviews. Another firm lost a sale worth \$450 million. Beyond this, France, Germany, the United Kingdom, Canada, and Japan have complained about difficulties in obtaining approval for civilian programs.

In another example in the press, this one in *Space News* on August 2, 1999, the Canadian Space Agency reportedly may drop a major U.S. space producer as the builder of its satellites because of difficulties the U.S. firm is having in obtaining State Department approval. An accompanying article quoted Intelsat's Director-General as saying that Intelsat is prepared to select a non-U.S. contractor to build its next generation satellites even though there may be a slightly higher price, given the difficulties Intelsat faces in getting even basic information under the "newly restrictive U.S. law on satellite technology transfers." Similar complaints have been heard from Arianespace and from Japan's National Space Agency. It is difficult to see the benefits to our national security of restrictions that fall primarily on our closest allies and that make U.S. firms uncompetitive.

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See comment 8.

Matters are compounded by the recent string of U.S. launch failures. There has also been confusion among agencies as to whether the retransfer of satellites also requires the retransfer of a number of commercial items used in space (most transferred to Commerce by the Bush Administration, prior to the transfer of any satellites to Commerce) to be licensed as munitions. The decision to retransfer jurisdiction of satellite exports was made before the Select Committee had completed its investigation and found no evidence of any failure of the post-1996 conditions to protect national security. The draft report might be more useful if it focused on the difference in Commerce conditions before and after November 1996 and if it addressed the question as to whether, in light of the general confirmation that the post-1996 conditions worked well in protecting our national security, the retransfer best serves the national interest.

**Specific Comments**

See comment 9.

Page 2, 2nd paragraph, line 9: should read "At the time, Commerce did not consider these three license conditions as necessary, and all agencies agreed to the issuance of licenses without them."

Rationale - accuracy, completeness.

See comment 10.

Page 2, 3rd paragraph, line 2: should read "DOD and State documents report allegations that unauthorized transfers of low level technology..."

Rationale - accuracy, completeness.

See comment 11.

Page 3, 1st paragraph, second line: Add a new sentence after "ballistic missiles": "As the Cox Committee Report notes, there are differing views within the U.S. Government as to the extent to which the information allegedly imparted to the People's Republic of China (PRC) may assist the PRC in its missile development. There is agreement that any such improvement would pertain to reliability and not to range or accuracy."

Rationale - accuracy, completeness. See, for example, Chapter 2(c), p. iii of the Select Committee's report.

See comment 12.

Page 4, 1st paragraph: delete entire sentence: "By design, Commerce gives greater weight to economic and commercial concerns..."

Rationale - This is incorrect. Under the Export Administration Act and the Export Administration Regulations, controls and licensing decisions are made on the basis of national security and foreign policy. This is in part why a separate bureau was established in Commerce in 1987 to do export licensing. In addition, the President's December 1995 Executive Order on Licensing gives the State and Defense Departments an equal voice in Commerce licensing decisions. This only reinforces the point that the report needs to distinguish between Commerce practices before 1996 and those after 1996.

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See comment 9.

Page 4, 2nd paragraph, sentence 2: should read, "As a result of an interagency review ordered by President Bush, to identify..."

Rationale - Provides important context and additional clarity.

Now on pp. 4-5.

See comment 9.

Page 4, 2nd paragraph, sentence 10: redraft to read "As a result of the regulatory changes, Commerce and State shared satellite jurisdiction; the characteristics of a particular satellite determined which agency had jurisdiction to issue an export license for the export of the satellite."

Rationale - The use of "either agency could issue..." makes it appear that jurisdiction was random.

See comment 13.

Page 5, 3rd paragraph, sentence 1: Redraft to read: "Development and production data for space launch vehicles are controlled under both the Wassenaar Arrangement (a multilateral national security regime) and the Missile Technology Control Regime. In the United States these controls are covered by the International Traffic in Arms Regulations. It is U.S. policy not to transfer technology that could improve a foreign country's launch vehicle since the technology used in launch vehicles to place a satellite in orbit can also be used in developing ballistic missiles."

Now on p. 8.

See comment 14.

Page 6: Amend the beginning of the last sentence to read: "The agreements give the United States the right to oversee and monitor implementation..."

Rationale - Accuracy. The statement as drafted is incorrect.

Now on p. 7.

See comment 15.

Chart following page 6, the box labeled "Reentry Vehicle - Similar to SLV return capsule technology": The box should explain: "The fairing that protects the satellite during ascent; it opens at a certain altitude to free the satellite." Unlike the reentry vehicle, the fairing is only used to protect the satellite during ascent and therefore is not designed to take the aerodynamic loadings and thermal stress associated with re-entering the earth's atmosphere.

Now on p. 8.  
See comment 16.

Page 7: The sentence describing DOD's role should be revised to make it clear that DOD, like State, can make recommendations on approving applications and imposing conditions on commercial communications satellites exports under Commerce's licensing jurisdiction. As written, the report implies DOD plays less of a role than State in reviewing such applications.

Now on p. 8.  
See comment 9.

Page 7: The first full paragraph should be revised to make it clear that Commerce issued these licenses with the concurrence of State and Defense.

Now on p. 11.  
See comment 2.

Page 10, table 2: This table deals with two different periods and is thus misleading. To be more accurate, it should differentiate between satellites licensed before and after 1996. For example, State did not license any satellites in the period between December 1996 and March 1999, a fact obscured by the chart.

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Now on p. 13.

Page 12, line 2: Insert after "these launch campaigns.":

See comment 5.

"In the February 1993 Satellite Technology Safeguards (STS) agreement, it defines the "Technology Control Plan" as the procedures detailed in the technology control plans in the contracts regarding the launch of the U.S. manufactured satellites between the consignee and the Chinese launch provider. In that same document, under section II, Authorized Technical Data, the data under Commerce jurisdiction (form, fit and function) is defined the same as in the Commerce licenses and is specifically authorized to be disclosed. Thus, by defining in the conditions that data which was under Commerce jurisdiction and releasable, there was no further need for a Technology Transfer Control Plan."

See comment 17.

"While the STS says that the Government of the United States of America shall oversee and monitor implementation of the Technology Control Plans, there was no corresponding guidance as to how or by whom that activity would be completed. There was no regulatory guidance at that time that the costs of such monitoring would be borne by the license applicant."

See comment 18.

"Many Government to Government agreements have very restrictive distribution and release guidelines. Commerce in conjunction with State and DOD concluded early in 1993 that it was preferable to define in the conditions those critical requirements of the STS agreement rather than making widespread distribution of the STS document."

Now on p. 16.

See comment 1.

Page 15: The overall tone of this section, notwithstanding the statement in the introductory paragraph, is that the split jurisdiction and related differences in license conditions, were the primary causes of these alleged violations. Yet most of the examples of possible unauthorized transfers cited on pages 15 and 16, such as the Intelsat 708 and Boeing's Sea Launch matters, involved transactions that were clearly under State Department's licensing jurisdiction and subject to State's more extensive license conditions. The report should clearly note that more extensive license conditions do not necessarily mean greater control.

Now on pp. 19.

See comment 19.

Page 19, 2nd bullet: Insert new final sentence to read: "However, as the Report of the Select Committee notes in regard to the information provided by Hughes, it is not clear, at present, that the PRC has any reason to use a fairing in a current missile program, and no PRC missile currently deployed uses fairings."

Page 21, insert at the end of the first paragraph:

"Since January 1997, Commerce has been using the same conditions as State. The Commerce license processing time is on average 100 days shorter than State's. Items controlled internationally as dual-use items will now be licensed in the United States as munitions list items with the attendant restrictions on marketing, country restrictions, Congressional notification, and the other processing issues associated with State Department licensing."

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See comment 20.

“The positive contribution of the legislation is the creation of the Space Launch Monitoring Division with staffing to support launch and meeting monitoring as specified in the license conditions.”

Page 23, 2nd paragraph: Insert at the end of the paragraph:

“Beyond this, recent legislative changes do not address other crucial implementation problems. The retransfer of licensing authority has not gone as smoothly as one might have hoped. One satellite firm, for example, announced (in the *Wall Street Journal*) that it would lose as much as \$174 million because of delays in license reviews. Beyond this, France, Germany, the United Kingdom, Canada, and Japan have complained about difficulties in obtaining approval for civilian programs. In another article, this one in *Space News* on August 2, 1999, the Canadian Space Agency reportedly may drop a major U.S. space producer as the builder of its satellites because of difficulties the U.S. firm is having in obtaining State Department approval. An accompanying article quoted Intelsat’s Director-General as saying that Intelsat is prepared to select a non-U.S. contractor to build its next generation satellites even though there may be a slightly higher price, given the difficulties Intelsat faces in getting even basic information under the “newly restrictive U.S. law on satellite technology transfers.” Similar complaints have been heard from Arianespace and from Japan’s National Space Agency. It is hard to see the benefits to our national security of restrictions that fall primarily on our closest allies and that make U.S. firms uncompetitive.

See comment 21.

“There has also been confusion among agencies as to whether the retransfer of satellites also requires the retransfer back to State of a number of commercial items used in space (most transferred to Commerce by the Bush Administration, prior to the transfer of any satellites to Commerce) to be licensed as munitions. The decision to retransfer jurisdiction was made before the Select Committee had completed its investigation and found no evidence of any failure of the post-1996 conditions to protect national security.”

See comment 2.

Additionally, the draft report would be more useful if it focused on the difference in Commerce conditions before and after November 1996 and if it addressed the question as to whether, in light of the general confirmation that the post-1996 conditions worked well in protecting our national security, the retransfer best serves in the national interest.”

Now on p. 24.  
See comment 16.

Page 25: Revise the last sentence of the second full paragraph to make it clear that it is the Executive Order (12891) that sets a 90-day deadline for an interagency decision on license applications submitted to Commerce unless certain circumstances allow more time.

See comment 22.

Note: As of August 7, 1999, the information on the launch campaigns in Russia on pages 11-12 remains subject to section 12(c) of the Export Administration Act of 1979, as amended. As such, it may not be publicly released unless the Under Secretary for Export Administration determines that its release is in the national interest.

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The following are GAO's comments on the Department of Commerce's letter dated August 17, 1999.

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## GAO Comments

1. We do not agree that the 1996 transfer of jurisdiction resolved the problems we identified. As noted in our report and reflected in our recommendation, the agencies' shared jurisdiction over satellite exports, inconsistent approaches to applying conditions to safeguard technology, and, at times, poor coordination and implementation of U.S. government policy were critical flaws in the process that contributed to many of the problems now being investigated. Further, jurisdiction over these satellite exports continued to be shared after 1996, with State responsible for licensing exports of technical data that exceeded the limits of form, fit, function data under Commerce's control. This shared jurisdiction over technical data contributed to some confusion by satellite exporters over which agency controlled technical data and what U.S. government policy was on these exports.
2. The objectives of this review were to assess how the licensing agencies applied safeguards to satellite exports, what problems have been reported, and whether recent legislative changes address these problems. In this report, we did not assess whether the President's 1996 decision to transfer jurisdiction for satellite export licensing to Commerce was a correct decision.
3. Commerce licenses did not consistently include conditions requiring adherence to the government-to-government technology safeguards agreements. As noted in tables 3 and 4, Commerce licenses for 13 launch campaigns between 1993 and 1996 did not include a condition requiring the exporter to comply with safeguards agreements. It was not until 1997, after DOD repeatedly raised concerns and months of negotiation, that Commerce agreed to include this as a standard condition.
4. As the report states, DOD and State did not consistently recommend that Commerce include all the license conditions that State had used because they assumed that these requirements would be added to State-issued licenses for technical data for these launch campaigns. The satellite exporters in the eight cases where conditions were omitted did not obtain separate State technical assistance licenses. Commerce licenses after the 1996 transfer did contain the license condition, but only because DOD and State had become aware that unmonitored launch campaigns had occurred and insisted that Commerce begin including this condition in every license.

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The decision to include these conditions was not directly related to the President's decision to transfer licensing jurisdiction to Commerce.

5. While Commerce licenses before 1997 authorized the export of only "form, fit, and function" technical data, Commerce did not include on these licenses a safeguard or control mechanism to insure that this happened. Tables 3 and 4 show that Commerce licenses prior to January 1997 did not include requirements that exporters prepare technology transfer control plans. Commerce's position that the plans were not necessary prior to 1997 because the technology under its control was "releasable" overlooks the role of these plans in preventing the release of technology that is not "releasable." The plans provide an internal control mechanism for the U.S. government and the exporter to insure that technical data beyond what is authorized for export is not released. It is through procedures established in these plans that DOD reviews technical data prior to release to the launch service provider. Further, as noted in the report, DOD and State officials assumed that the exporter would have to obtain a State technical assistance license to perform the launch and that this would provide a vehicle to apply controls over technical assistance and data exchange during the launch.
6. As we have noted, the problems we identified are much broader than simply what conditions Commerce or State placed on satellite export licenses. Commerce and State did not clearly define the limits of technical data controlled by each agency and, until after 1996, imposed different safeguards on these exports. In addition, Commerce, State, and DOD have not developed an interagency understanding clarifying the roles and responsibilities each will play in implementing U.S. policy on satellite exports. Our recommendation in this report directly addresses this situation.
7. The conditions imposed by Commerce after October 1996 mirrored the controls used by State since the first authorized export in 1989. As Commerce notes, the imposition of conditions on licenses to safeguard sensitive technology may not be effective if these safeguards are not effectively implemented. The problems with the Apstar 2 and Intelsat 7 failure reviews discussed in the Select Committee's report underscore the need for coordinated policy and interagency implementation of U.S. export controls on satellites. This is why our report recommends that State, in coordination with DOD and Commerce, establish clear roles and responsibilities for all agencies and overseas posts in implementing U.S. policy on these exports.

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8. Our report did not find that the 1996 transfer of jurisdiction resolved the problems we identified. As noted in our report, the agencies' differing policies and, at times, poor coordination and implementation of U.S. government policy were critical flaws in the process that contributed to many of the problems now being investigated. Further, jurisdiction over these satellite exports continued to be shared after 1996, with State responsible for licensing exports of technical data that exceeded the limits of form, fit, and function data under Commerce's control. The shared jurisdiction over technical data created ambiguity and some confusion for exporters on how the U.S. government controlled this information.
9. The information in our report is accurate as presented.
10. We do not agree that the technology was "low level". DOD has concluded that the technology transferred in some of these cases may have improved China's ballistic missile programs.
11. We disagree with Commerce's characterization of the House Select Committee's report, U.S. National Security and Military/Commercial Concerns with the People's Republic of China. As noted in the report (Vol. II, p. 171), DOD found that the technology transferred could improve China's launch vehicle guidance systems. Specifically, a 1997 DOD analysis, as quoted in the report, stated that "significant benefits derived by China from these activities are likely to lead to improvements in the overall reliability of their launch vehicles [rockets] . . . and in particular their guidance systems. [emphasis added]." Moreover, a May 1999 report by the Senate Select Committee on Intelligence notes that while, initially, the intelligence community agencies differed on the significance of technology transfer in the Intelsat 708 accident investigation, they subsequently agreed that the information could help China's design and test practices and the reliability of its space launch vehicles. While acknowledging that differences remain within the intelligence community as to the likelihood that China has used this information, the Senate report concludes that the information transferred in the Apstar 2 and Intelsat 708 launch failure investigations may improve China's space launch and ballistic missile programs.
12. Under the Export Administration Act, Commerce is to consider national security issues in reviewing export applications. However, under the act, Commerce is charged with weighing U.S. economic and trade interests with national security and foreign policy interests when deciding when an item should be controlled. Under the Arms Export Control Act,

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economic interests are not cited as a factor to be considered by State in establishing the Munitions List or reviewing munitions export applications.

13. The sentence as written is accurate. Commerce's language suggests that only State controls items subject to the Wassenaar Arrangement and the Missile Technology Control Regime. However, many items under Commerce's jurisdiction are subject to the controls of the Wassenaar Arrangement and the Missile Technology Control Regime. As Commerce and our report note, State, under its regulations, controls technology related to launch vehicles.
14. The statement in our report is accurate. The 1993 government-to-government technology safeguards agreement with China states "[t]he Government of the United States of America shall [emphasis added] oversee and monitor implementation of the Technology Control Plan, and the Government of the People's Republic of China shall permit and facilitate that monitoring". The agreements with Russia, Ukraine, and Kazakhstan contain similar language.
15. The graphic prepared by the Central Intelligence Agency shows the applicability of space launch vehicle technology to ballistic missiles. In a missile application, the fairing is referred to as a "shroud" and is used on ballistic missiles with multiple reentry vehicles and multiple independently targeted reentry vehicles.
16. We have incorporated the suggested changes, as appropriate.
17. Since licensing jurisdiction for certain commercial communications satellites was first moved to Commerce in 1992, Commerce has been responsible for issuing guidance on the export of satellites under its jurisdiction. The government-to-government technology safeguards agreements, first negotiated with China in 1988, clearly articulated U.S. interests in ensuring that sensitive technology was not transferred during these launch campaigns. The absence of "regulatory guidance" was not a problem for State. As we note in our report, State consistently required DOD monitors at technical meetings and at the launch and the preparation of technology transfer control plans.
18. This document was neither classified nor restricted and was made available to satellite exporters by State. The agreements with China, signed in 1989 and 1993, were made publicly available and, as noted in our report,

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State consistently required compliance with the agreements from the first launch licensed in 1989.

19. The discussion in this section shows the lack of coordination by Commerce when it approved the release of sensitive technical data applicable to China's launch vehicles. U.S. policy, as articulated in the government-to-government technology safeguards agreements, is that no technology may be released that could improve a foreign country's launch vehicle since this technology could also be used to improve a country's ballistic missiles. As the Select Committee report notes, China's "experience and knowledge of the aerodynamic and other loading conditions and environments on rocket fairings, and the structural design process taking these conditions into account, would stand them in good stead in developing fairings (or shrouds) for ballistic missiles."
20. Commerce correctly states that a positive contribution of the legislation is the creation of a new Space Launch Monitoring Division at DOD to support the monitoring requirements as specified in the export licenses. As we note in our report, the recent legislative changes will also address some of the other apparent causes of the export licensing problems by reducing any confusion caused by shared export licensing jurisdiction over technical data.
21. The Select Committee's report did not assess whether the licensing conditions imposed by Commerce beginning in January 1997 worked well in protecting national security.
22. We obtained written permission from the companies in August 1999 to release the information on the launch campaigns in Russia.

# Objectives, Scope, and Methodology

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In response to congressional concern regarding the licensing of satellite exports, we assessed the safeguards applied to the export of U.S. commercial communications satellites for launch by Chinese, Russian, and Ukrainian launch vehicles from 1989, when the first launch was approved, to February 1999. Specifically, we (1) identified the license conditions applied by Commerce and State during the export licensing process to protect sensitive technology and (2) determined whether State and DOD identified possible unauthorized technology transfers and violations of export control regulations with these launches. In addition, we assessed whether recent legislative changes will reduce the risks of unauthorized exports of sensitive U.S. technology.

To identify the types of safeguards that have been applied to foreign launches, we researched applicable export regulations; reviewed government-to-government technology security agreements with China, Russia, Ukraine, and Kazakhstan related to satellite technology safeguards; and interviewed State, Commerce, and DOD licensing officials. We then identified the rights of the United States in those foreign countries under the technology security agreements to safeguard technology and compared the rights with the actual license conditions imposed on U.S. exporters by Commerce and State.

To determine if Commerce and State included safeguards in export licenses for the launches of U.S. commercial communications satellites on Chinese, Russian, and Ukrainian launch vehicles, we first identified the universe of relevant export licenses approved from the time launches by China were first authorized in 1989 until February 1999. We reviewed State and Commerce license databases, requested the major satellite manufacturers to provide information on these cases, and reviewed license documentation and other memoranda maintained by DOD. Because we were interested in the licensing actions of State and Commerce, we included in our review all licenses issued for the export of commercial communications satellites for launch by China, Russia, and Ukraine regardless of whether the launch provider was later changed and the satellite was launched by another country. We did not include in our analysis exports of satellite components.

We did not perform work to assess the actual implementation of these export license requirements. For example, we did not review the adequacy of technology transfer control plans or the training of DOD monitors, nor did we monitor an overseas launch campaign. At the time of our review, both the Senate Select Committee on Intelligence and the House Select

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**Objectives, Scope, and Methodology**

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Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China were conducting investigations into the implementation of these conditions.

To determine whether unauthorized technology transfers and violations of export regulations on launches by China, Russia, and Ukraine have been identified, we interviewed DOD, State, and Commerce officials. We also interviewed DOD officials who monitored some of the launches and reviewed licensing records, DOD monitor trip reports, export violation settlement documents, and other relevant documentation when available. This review included examining thousands of documents provided by DOD and State to Congress in response to the numerous congressional hearings held on this subject in 1998. In addition, in several cases, we discussed the various allegations with the satellite companies involved. Investigations of many of the compliance problems with the launches by China and Russia cited in our report were still ongoing at the time of our review.

To determine whether sensitive technology was released as a result of these compliance problems, we interviewed DOD officials and monitors responsible for monitoring overseas launches and asked State and DOD officials if any damage assessments had been performed on these cases. We reviewed the damage assessments performed by State and DOD on the two cases where such studies had concluded that sensitive technology had been transferred. In many of the compliance problems we cited, the investigations were new or ongoing, and damage assessments had not been performed at the time of our review.

To determine whether recent legislative changes have reduced the risks of unauthorized transfers of sensitive U.S. technology, we first reviewed the compliance problems that had been identified with these exports. We interviewed State, DOD, Commerce, and industry officials on their views of the causes of these problems. We then compared the changes mandated by the fiscal year 1999 National Defense Authorization Act and State's planned implementation of these changes. We also solicited comments on these recent changes from satellite manufacturers and operators.

We conducted our review between August 1998 and June 1999 in accordance with generally accepted government auditing standards.

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# GAO Contact and Staff Acknowledgments

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## GAO Contact

James Shafer (202) 512-6002

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## Acknowledgments

In addition to the name above, David C. Trimble, Eugene Beye, Jiyearn Chung, and Judith Knepper made key contributions to this report.

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# Related GAO Products

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Export Controls: 1998 Legislative Mandate for High Performance Computers (GAO/NSIAD-99-208, Sept. 24, 1999).

Export Controls: Information on the Decision to Revise High Performance Computer Controls (GAO/NSIAD-98-196, Sept. 16, 1998).

Export Controls: National Security Issues and Foreign Availability for High Performance Computer Exports (GAO/NSIAD-98-200, Sept. 16, 1998).

Export Controls: Changes in Controls Applied to the Export of High Performance Computers (GAO/T-NSIAD-98-250, Sept. 16, 1998).

Evolved Expendable Launch Vehicle: DOD Guidance Needed to Protect Government's Interest (GAO/NSIAD-98-151, June 11, 1998).

Export Controls: Issues Related to the Export of Communications Satellites (GAO/T-NSIAD-98-208, June 10, 1998).

China: U.S. and European Union Arms Sales Since the 1989 Embargoes (GAO/T-NSIAD-98-171, Apr. 28, 1998).

Hong Kong's Reversion to China: Effective Monitoring Critical to Assess U.S. Nonproliferation Risks (GAO/NSIAD-97-149, May 22, 1997).

Export Controls: Sales of High Performance Computers to Russia's Nuclear Weapons Laboratories (GAO/T-NSIAD-97-128, Apr. 15, 1997).

Export Controls: Change in Export Licensing Jurisdiction for Two Sensitive Dual-Use Items (GAO/NSIAD-97-24, Jan. 14, 1997).

Export Controls: Sensitive Machine Tool Exports to China (GAO/NSIAD-97-4, Nov. 19, 1996).

Export Controls: Sale of Telecommunications Equipment to China (GAO/NSIAD-97-5, Nov. 13, 1996).

Nuclear Weapons: Russia's Request for the Export of U.S. Computers for Stockpile Maintenance (GAO/T-NSIAD-96-245, Sept. 30, 1996).

National Security: Impact of China's Military Modernization in the Pacific Region (GAO/NSIAD-95-84, June 6, 1995).

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**Related GAO Products**

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Export Controls: Issues Concerning Sensitive Stealth-Related Items and Technologies (GAO/T-NSIAD-95-158, May 11, 1995).

Export Controls: Concerns Over Stealth-Related Exports  
(GAO/NSIAD-95-140, May 10, 1995).

Export Controls: Some Controls Over Missile-Related Technology Exports to China Are Weak (GAO/NSIAD-95-82, Apr. 17, 1995).

Export Controls: License Screening and Compliance Procedures Need Strengthening (GAO/NSIAD-94-178, June 14, 1994).

Nuclear Nonproliferation: Export Licensing Procedures for Dual-Use Items Need to Be Strengthened (GAO/NSIAD-94-119, Apr. 26, 1994).

Export Controls: Issues in Removing Militarily Sensitive Items From the Munitions List (GAO/NSIAD-93-67, Mar. 31, 1993).

Export Controls: Actions Needed to Improve Enforcement  
(GAO/NSIAD-94-28, Dec. 30, 1993).

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